To: Daniel Telvock[dtelvock@investigativepost.org]
Cc: Rodriguez, Elias[Rodriguez.Elias@epa.gov]; Michael Basile (Basile.Michael@epa.gov)[Basile.Michael@epa.gov]; Lyndsey Nguyen (Nguyen.Lyndsey@epa.gov)[Nguyen.Lyndsey@epa.gov]
From: Daly, Eric
Sent: Fri 2/3/2017 3:04:23 PM
Subject: Questions from 02-01-2017 conference call with Dan Telvock
Outdoor_Worker_rad__07MAR2016_prg3055_8hours_225days.pdf
Outdoor_Worker_rad__23FEB2016_prg23552_8hours_225days.pdf
Ionizing Radiation Series No 2_Health Effects.pdf
SecularEquilibrium.pdf

Good Morning Dan:

Below is a write up that Lyndsey put together for you in regard to our conversation on Wednesday. Thanks and have a good weekend.

Listed below are a few things discussed during our call that I thought would be beneficial to Dan:

I mentioned in the call that if Ra-226 is being cleaned up that U-238 would be cleaned up, as well. Attached is a document called "SecularEquilibrium." This document shows the "decay chain" of U-238 and Th-232, known as "parent" radionuclides. Each time that the parent decays, it decays to "progeny" radionuclides. These progeny radionuclides will be co-located with the parent radionuclides. Therefore, if we clean up the progeny radionuclides, we are cleaning up everything in the decay chain including the parent. Example, if we clean up Ra-226, we are cleaning up U-238, as well. Likewise, if we clean up Ra-228, we are also cleaning up Th-232. The "SecularEquilibrium" document is a great visual to see how the parent radionuclide decays (alpha, beta, gamma) and which radionuclide it turns into after decaying. Our site team loves this document!

The attached documents are the risk calculations per radionuclide performed for NFB for the most restrictive scenario (i.e. outdoor worker). There were two risk calculations performed:

1. Decay chain for suspected extracted Thorium Waste (the decay chain in secular equilibrium)—file name: Outdoor_Worker_rad__23FEB2016_prg23552_8hours_225days.pdf

2. Decay chain for suspected Uranium-238 and/or Thorium-232 waste (the dacay chain not in secular equilibrium)—file name: Outdoor_Worker_rad__23FEB2016_prg23552_8hours_225days.pdf

The below document explains a lot about our risk program and our risk calculator (i.e. the PRG Calculator): EPA PRG Calculator

I had to do a lot of digging on the EPA website. The document attached called “Ionizing Radiation Series No 2_Health Effects” has the wording that I mentioned on the phone about EPA’s stance on “any exposure of radiation is harmful.” I believe this document has been redacted due to the inaccuracy (e.g. should not state harm/danger/safe but rather should state risk). I’m sorry for misquoting. EPA’s current website has the latest, more current stance on radiation which states:

“U.S. radiation protection standards are based on the premise that any radiation dose carries some risk,

and that risk increases directly with dose. This method of estimating risk is called the ‘linear no-threshold

model (LNT assumption that the risk of cancer increases linearly as radiation dose increases. This means,

for example, that doubling the dose doubles the risk and that even a small dose could result in a

correspondingly small risk. Using current science, it is impossible to know what the actual risks are

at very small doses.)’."

EPA Radiation Health Effects

As an EPA Health Physicist, I absolutely love my job of getting to speak to others including the public about radiation science. I understand that this was not an easy topic to discuss especially over the phone. I would be happy to have another call to elaborate on anything that was discussed today or topics that we did not get to discuss. I'm a huge nerd so I know how excited I can get with going off topic when discussing radiation. I hope I answered all of the questions.

Lastly, here is the Inverse Square Law that was discussed: Inverse Square Law

Thanks for being patient with me.

Lyndsey

Lyndsey Nguyen

Environmental Response Team-Las Vegas

Phone: 702.784.8018

Cell: 702-373-3756

Email: Nguyen.Lyndsey@EPA.gov